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Archie W. Garner

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06/23/2010

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EXAMINER

GILLESPIE, BENJAMIN

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The time period for reply, if any, is set in the attached communication.



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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/521,225  
Filing Date: July 06, 2005  
Appellant(s): GARNER ET AL.

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James J. Napoli  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 4/1/2010 appealing from the Office action mailed 7/2/2009.

**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The following is a list of claims that are rejected and pending in the application:

1-3, 5-25, and 26-27

**(4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

**(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

**(8) Evidence Relied Upon**

5,338,613	TOMOTSUGU ET AL	08-1994
4,213,837	BRISTOWE ET AL	4,213,837
4,745,003	SIRKOCH ET AL	05-1988

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

**Issue I – The rejection of claims 26 and 27 under 35 U.S.C. 112, first paragraph**

Claims 26 and 27, which were newly presented in the amendment filed 10/22/2008, do not contain sufficiently support in the instant specification. Although page 9 of the instant

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specification states the *upper limit* of triol can be 5 mol%, there is no teaching that the *lower limit* is 1.4. Example 3 fails to cure this deficiency since it never discloses using 1.4 mole% in a range of values – it can not be determined if 1.4 mole% can be used as a limit on a range of values, let alone a *lower limit*. Still, if appellants maintain that the amount of triol in example 3 would be sufficient to establish a lower limit, it should be noted that said range still constitutes new matter since claims 1, 22, 26, and 27 are open to *any type of triol*, while example 3 only uses trimethylolpropane. There is no statement that the 1.4 mole% would be suitable for all types of triol, as allowed by claims 26 and 27.

**Issue II – The rejection of claims 1-3, 5-12, 16-21, and 26 under 35 U.S.C. 102(b) as being anticipated by Tomotsugu et al ('613).**

Tomotsugu et al teach urethane acrylate resin comprising the reaction product of:

- i) hydroxyl-functional polyester,
- ii) polyisocyanate, and
- iii) 2-hydroxyethyl (meth)acrylate.

Wherein the polyester polyol is the reaction product of aliphatic cyclohexane-dicarboxylic acid, and a mixture of diol and triol, specifically 60-100% diol and 0-40% triol (Abstract; col 2 lines 64-68; col 3 lines 1-13). The diol consists of compounds such as butanediol, neopentyl glycol, and pentanediol, and said triol consists of glycerol and trimethylolpropane (Col 2 lines 30, 39-46, 54-53). The resulting composition has no residual free isocyanate, and further contains additional components such as pigments and initiators (Col 4 lines 46-63; col5 lines 56-58).

The resulting urethane acrylate is useful in coatings, and based on analogous reactants and overlapping stoichiometry the position is taken that said composition would inherently exhibit properties that would satisfy the claimed "gel coat" limitation (Claims 6 and 7).

It is noted that Tomotsugu et al fail to teach the claimed product-by-process methodology, and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Therefore, absent showing of criticality, the process limitations in a product-by-process claim do not carry patentable weight. The claimed composition does not appear to be patentably distinct from the urethane acrylate disclosed by Tomotsugu et al.

**Issue III – The rejection of claim 26 under 35 U.S.C. 103(a) as being unpatentable over Tomotsugu et al ('613).**

As previously discussed in Issue II, Tomotsugu et al teach branched urethane acrylates that are the reaction product of i) polyester polyol, ii) diisocyanate, and iii) hydroxyl-functional acrylate. Component i) is the reaction product of diol, triol, and dicarboxylic acid, wherein said triol may comprise between 0 and 40 mole% based on 100 mole% of diol+triol. Patentees fail, however, to explicitly teach the claimed mole% of claim 26.

Nevertheless, one of ordinary skill would understand that as the amount of triol increases, the resulting urethane acrylate changes from a predominantly linear backbone to a branched backbone. As the degree of branching increases, the degree of crosslinking would also increase when the urethane acrylate is cured. Increased crosslinking has a direct relationship with increased hardness, and thus the amount of triol acts as a result effective variable. Therefore it would have been obvious to one of ordinary skill in the art to arrive at the range of claim 26 since it has been held that where the general conditions of a claim are disclosed by the prior art, finding an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

**Issue IV – The rejection of claims 1-3, 5-12, 16-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomotsugu et al ('613) in view of Bristowe et al ('837).**

As previously discussed in Issue II, Tomotsugu et al teach a urethane acrylate resin comprising the reaction product of i) hydroxyl-functional polyester, ii) polyisocyanate, and iii) 2-hydroxyethyl (meth)acrylate, wherein i) is the reaction product of aliphatic cyclohexane-dicarboxylic acid, and a mixture of diol and triol, specifically 60-100% diol and 0-40% triol (Abstract; col 2 lines 64-68; col 3 lines 1-13). The diol consists of compounds such as butanediol, neopentyl glycol, and pentanediol, and said triol consists of glycerol and trimethylolpropane (Col 2 lines 30, 39-46, 54-53).

The resulting composition has no residual free isocyanate, and further contains additional components such as pigments and initiators (Col 4 lines 46-63; col5 lines 56-58). Tomotsugu et

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al teach that the resulting urethane acrylate is useful in coatings, however patentees fail to teach the claimed method, or specify the resin as a "gel coat" (Claims 6 and 7).

Bristowe et al teach an acrylate-terminated urethane coating composition comprising i) oligoester, ii) isophorone diisocyanate, and iii) hydroxyethyl acrylate (Abstract; col 2 lines 1-9, 35-36; col 4 lines 42; and col 5 line 35). The preferred method of production comprises first blending i) with iii), then mixing in ii) (Col 5 lines 67-68; col 6 lines 1-7). This method allows for better control of the exothermic reaction and minimizes the formation of by-products without substantially affecting the nature of the resulting vinyl ester urethane (Col 6 lines 17-22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to utilize the method of Bristowe et al in Tomotsugu et al since Bristowe et al teach it as a preferred method for the production of urethane acrylates since it helps the user better control the amount of heat generated during the urethane forming reaction and thus prevents unwanted premature consumption of acrylate groups.

Regarding applicants' claimed "gel coat" limitation, although Tomotsugu et al fail to refer to the urethane acrylate composition as a "gel coat," based on analogous reactants, stoichiometries, and method of production, one would reasonably expect said urethane acrylate to exhibit the same properties as claimed by applicant.

Finally, regarding claim 27, Tomotsugu et al teach i) is the reaction product of diol, triol, and dicarboxylic acid, wherein said triol may comprise between 0 and 40 mole% based on 100 mole% of diol+triol. Still however patentees fail to explicitly teach the claimed triol mole %.

Nevertheless, as discussed in Issue III, the amount of triol is a result effective variable. Therefore it would have been obvious to one of ordinary skill in the art to arrive at the range of



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claim 27 since it has been held that where the general conditions of a claim are disclosed by the prior art, finding an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

**Issue V – The rejection of claims 1-3, 5-21, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sirkoch et al ('003).**

Sirkoch et al teach coatings comprising urethane acrylate produced by reaction (a) isophorone diisocyanate, (b) polyester polyol, and (c) hydroxylalkyl(meth)acrylate, wherein said coating further comprises pigment paste, free radical initiator, and said urethane acrylate is cured via free radical polymerization (Abstract; col 3 line 35-43; col 4 lines 6-8; col 5 line 45; col 6 lines 6-12). Regarding component (b), patentees teach it is the reaction product of dicarboxylic acid, such as adipic acid, and multi-functional alcohol, such as hexanediol, neopentyl glycol, and trimethylolpropane (col 4 lines 11-41).

Regarding the claimed mole % of triol, as discussed in Issue III the amount of triol is a result effective variable. Therefore, it would have been obvious to one of ordinary skill in the art to arrive at the claimed triol amount since it has been held that where the general conditions of a claim are disclosed by the prior art, finding an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Finally, it is noted that Sirkoch et al fail to teach product-by-process methodology corresponding to claim 1, and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process

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claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Therefore, absent showing of criticality, the process limitations in a product-by-process claim do not carry patentable weight. Thus the claimed composition does not appear to be patentably distinct from the urethane acrylate disclosed by Sirkoch et al.

**Issue VI – The rejection of claims 1-3, 5-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sirkoch et al ('003) in view of Bristowe et al ('837).**

As previously discussed in Issue V, Sirkoch et al teach coating compositions comprising urethane acrylates, however patentees fail to teach the claimed methodology of claims 1 and 22.

As previously discussed in Issue IV, Bristowe et al teach an acrylate-terminated urethane coating composition comprising i) oligoester, ii) isophorone diisocyanate, and iii) hydroxyethyl acrylate, wherein the oligoester is first blended with the hydroxyethyl acrylate, forming an intermediate mixture that is then reacted with diisocyanate (Col 5 lines 67-68; col 6 lines 1-7). This method allows for better control of the exothermic reaction and minimizes the formation of by-products without substantially affecting the nature of the resulting vinyl ester urethane (Col 6 lines 17-22).

Therefore it would have been obvious to one of ordinary skill within the art at the time of invention to utilize the preferred method of Bristowe et al in Sirkoch et al based on the motivation that both teach vinyl functional urethane esters having analogous backbone

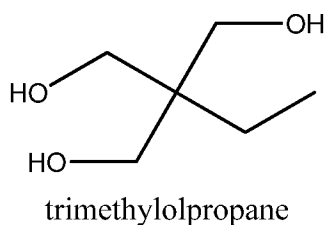
architecture, and the method of Bristowe et al allows for better control of reaction conditions and improved product.

**(10) Response to Argument**

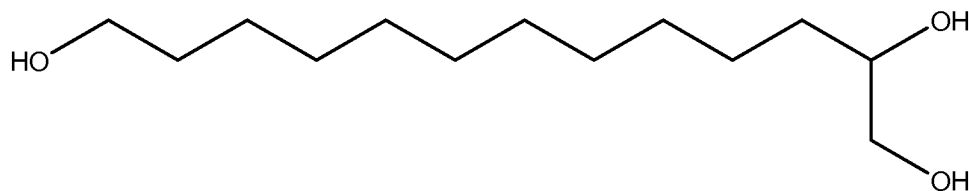
**Response to Issue I – The rejection of claims 26 and 27 under 35 U.S.C. 112, first paragraph**

Appellants argue that there is sufficient support for claims 26 and 27 in the instant specification because the teaching on page 9, which states “up to 5 mole%” encompasses all values from 0 to 5 mole%, and the 1.4 mole% of example 3 is between this range. Regardless of whether example 3 establishes a lower limit for trimethylolpropane (TMP), the position is maintained that example 3 fails to provide sufficient support for the breadth of claims 26 and 27.

The term “triol” covers numerous compounds that exhibit distinct backbone architecture from TMP. At the same mole %, using these distinct triols would in turn yield a distinct polyester polyol. For example TMP has the structure:



TMP, at most, has three carbon atoms between each hydroxyl group. However, when using a triol such as tridecane 1,2,13-triol



tridecane-1,2,13-triol

There are, at most, 13 carbon atoms between hydroxyl groups. **Using 1.4 mole% of tridecane-1,2,13-triol would result in a polyester polyol that has a lower frequency of branches as compared to a polyester polyol that is based on 1.4 mole% of trimethylolpropane.** Example 3 fails to provide sufficient support for the breadth of claims 26 and 27 since not all triol would result in the same polyester polyol.

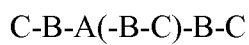
**Response to Issue II – The rejection of claims 1-3, 5-12, 16-21, and 26 under 35**

**U.S.C. 102(b) as being anticipated by Tomotsugu et al ('613).**

Appellants argue that Tomotsugu et al fail to anticipate the claimed invention because although urethane acrylates are produced using i), ii), and iii), Tomotsugu et al fail to teach the claimed product-by-process, and as a result the claimed reaction product is distinct from that of the prior art.

While Tomotsugu et al fail to teach the claimed product-by-process, appellants have yet to provide a factual side-by-side comparison against the prior art. The current argument is purely theoretically. Without said side-by-side comparison, applicants' remarks appears to be nothing more than an unsubstantiated opinion that is not persuasive.

Still, if appellants maintain their examples result in a oligomer system comprising:



*and*

C-B-C

The examiner would like to point out that their examples are not commensurate in scope with the claimed limitations. Claims 1 and 22 fail to specify the type of diisocyanate (i.e. aliphatic vs. aromatic) or list any stoichiometry for components (a):(b):(c). These would play a vital role in controlling the outcome of the of C-B-A(-B-C)-B-C + C-B-C system.

**Response to Issue III – The rejection of claim 26 under 35 U.S.C. 103(a) as being unpatentable over Tomotsugu et al ('613).**

Appellants' remarks have been rendered moot in view of the Response to Issue II.

**Response to Issue IV – The rejection of claims 1-3, 5-12, 16-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomotsugu et al ('613) in view of Bristowe et al ('837).**

Appellants argue the combination of Tomotsugu et al in view of Bristowe et al fail to render obvious the claimed invention because one of ordinary skill would understand the teachings of the secondary reference are not relevant to Tomotsugu et al. Instead appellants assert the examiner has used "hindsight analysis" in order to arrive at claims 1 and 22.

Specifically, appellants argue:

- (I) "The '837 patent... appears to be directed to UV curable resins rather than the thermally curable" resin of claim 1 and 22, and
- (II) The urethane acrylates of Bristowe et al are based on aromatic polyether, not the aliphatic polyester of the primary reference. One of ordinary skill would

understand that the motivation to control the exothermic reaction is only relevant for aromatic polymers, not the aliphatic polymers of Tomotsugu et al.

In response to (I), (meth)acrylate groups can be polymerized UV radiation *or* thermal exposure. The fact that Tomotsugu et al and Bristowe et al only disclose curing via UV radiation does not mean the relied upon urethane acrylates would fail to also cure thermally. Moreover, none of the claims set forth a limitation regarding "thermal curing".

Regarding (II), contrary to appellants' assertions the urethane acrylate of Bristowe et al comprises polyester segments. The formula on column 2, lines 6-8 teaches that the polyether diol comprises **M** linkages that are based on "polycarboxylic acid" - i.e. ester linkages.

It is noted that the relied upon teachings of Bristowe et al are based on "specific" polyesters that are different from the polyesters of Tomotsugu et al. Had Bristowe et al taught the same polyester of Tomotsugu et al, claims 1 and 22 would be rejected under 102(b) as being anticipated by Bristowe et al. The difference in polyester polyol does not establish that it is unobvious to combine the teachings of the prior art.

Before continuing, the examiner would like to briefly point out that both Tomotsugu et al and Bristowe et al teach the production of urethane resins having (meth)acrylate functionality. These resins are applied as coatings, and then cured by free radical polymerization of the (meth)acrylate groups. It is crucial to understand that (meth)acrylate groups can prematurely polymerize if exposed to sufficient amounts of heat during the formation of the urethane groups. This premature polymerization would detrimental to the final coating since it is partially/fully pre-cured before even being applied to the desired substrate.

The reaction between isocyanate groups and hydroxyl groups is **exothermic** regardless of whether said isocyanate and hydroxyl groups are attached to aliphatic or aromatic compounds. Reading Bristowe et al, one of ordinary skill would understand the importance of controlling the amount of heat generated during the exothermic reaction when that same reaction system must also comprise unconsumed (meth)acrylate groups. Controlling the amount of heat generated during the exothermic reaction ensures that the acrylate functionality is preserved.

In response to appellants' position that "premature consumption of the hydroxyl group of the hydroxyl (meth)acrylate *cannot* occur" – it appears appellants have misunderstood the examiner's logic. The examiner never stated the hydroxyl groups of the (meth)acrylate are to be protected – the preservation of functional groups is only relevant for (meth)acrylate groups.

Finally, if appellants maintain that using the method of Bristowe et al with Tomotsugu et al is unobvious, the product-by-process of claim 1 is still rendered obvious. Column 3 lines 7-13 of Tomotsugu et al teaches that the NCO:OH ratio is "not less than 2", i.e. suitable NCO:OH ratios may be greater than 2:1, such as 2.2:1. At such a ratio, the reaction system would comprise free unreacted monomeric diisocyanate even after the hydroxyl groups of i) are consumed. Thus, when iii) is added to this system the reaction product would comprise oligomers of both C-B-A(-B-C)-B-C ***and*** C-B-C – albeit the C-B-C oligomer would be present in minor amounts, but claims 1 and 22 do not require a specific amounts of the C-B-C oligomer.

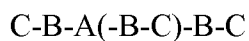
**Response to Issue V – The rejection of claims 1-3, 5-21, and 26 are rejected under 35 U.S.C.**

**103(a) as being unpatentable over Sirkoch et al ('003).**

Appellants argue that Sirkoch et al fail to render obvious the claimed invention because although urethane acrylates are produced using i), ii), and iii), there is no discussion of the claimed product-by-process. As a result the claimed reaction product is distinct from that of the prior art.

While Sirkoch et al fail to teach the claimed product-by-process, appellants have yet to provide a factual side-by-side comparison against the prior art. The current argument is purely theoretically. Without said side-by-side comparison, applicants' remarks appears to be nothing more than an unsubstantiated opinion that is not persuasive.

Still, if appellants maintain their examples result in a oligomer system comprising:



*and*



The examiner would like to point out that their examples are not commensurate in scope with the claimed limitations. Claims 1 and 22 fail to specify the type of diisocyanate (i.e. aliphatic vs. aromatic) or list any stoichiometry for components (a):(b):(c). These would play a vital roll in controlling the outcome of the of C-B-A(-B-C)-B-C + C-B-C system.

**Response to Issue VI – The rejection of claims 1-3, 5-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sirkoch et al ('003) in view of Bristowe et al ('837).**

Appellants' remarks have been rendered moot in view of the discussion of Bristowe et al set forth in the Response to Issue IV, and the discussion of Sirkoch et al in the Response to Issue V.



**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Benjamin J Gillespie/

Examiner, Art Unit 1796

Conferees:

/Christine Tierney/

Supervisory Patent Examiner, Art Unit 1700

/Milton I. Cano/      /M. I. C./

Supervisory Patent Examiner, Art Unit 1796